Türk Mikrobiyol Cem Derg (2003) 33:134-136

Chlamydia pneumoniae and Acute Myocardial Infarction

Mustafa AY(*), Mehmet OLDACAY(**), Günhan ERDEM(***)

(*)Çanakkale Onsekiz Mart University, Science and Arts Faculty, Department of Biology, Çanakkale.
(**)Clinical Microbiology Laboratory, State Hospital, Çanakkale
(***)Çanakkale Onsekiz Mart University, Health College, Çanakkale.

ÖZET

Chlamydia pneumoniae ve Akut Miyokard Enfarktüs

Ateroskleroz ve akut miyokard enfarktüs ile Chlamydia pneumoniae'ye karşı gelişen antikorlar arasında ilişki olduğu seroepidemiyolojik çalışmalarla saptanmıştır. Son yıllarda, koroner arterlerde oluşan aterom plaklarda C.pneumoniae varlığı gösterilmiştir.
Bu çalışmada, 60 akut miyokard enfarktüslü hasta ile 30 kontrol bireyinde anti C. pneumoniae antikorları araştırılmıştır. Hasta ve kontrol grubunu oluşturan bireylerden alınan serum örneklerinde, C. pneumoniae IqG antikorları, ELISA yöntemi ile belirlenmiştir. Ayrıca çalışma grubunu oluşturan bireylere bir anket uygulanarak, kişilere ait yaşam tarzı ve belirli alışkanlıklarına ilişkin sorular yöneltilmiştir. Sonuçlara göre, kontrol bireylerinden 16'sında (%53) pozitif, 14'ünde (%47) negatif sonuç saptanırken, 39 hasta bireyde (%78) pozitif, 11'inde de (%22) negatif sonuç tespit edilmiştir. Kontrol ve hasta bireyler arasındaki farklılığın istatistiksel olarak önemli olduğu saptanmıştır ($p<0.05$).

Anahtar kelimeler: Akut miyokard enfarktüs, kardiyovasküler hastalıklar, Chlamydia pneumoniae, ELISA.

SUMMARY

The interaction between patients with acute myocardial infarction and atherosclerosis and antibodies against to Chlamydia pneumoniae have been determined by seroepidemiological studies. In recent years, the presence of C.pneumoniae in atherom plaques at coroner arthers has been shown.
C.pneumoniae IgG antibodies were detected by the ELISA method in the sera of ? ?. On the other hand, by giving a questionnaire to the subjects, about life styles and habits of the subjects C.pneumoniae. According to the results, 39 patients (78%) were positive, 11 (22%) were negative, while 16 of the control subjects (53%) were positive, and 14 of them (47%) negative. The difference between the control group and the patients was statistically significant ($p<0.05$).

Key Words: Acute myocardial infarction, cardiovascular disease, Chlamydia pneumoniae, ELISA.

INTRODUCTION

Chlamydia pneumoniae, a gram-negative bacteria, is a human respiratory pathogen that causes acute respiratory diseases such as pneumonia, bronchitis, pharyngitis and sinusitis (1). The Chlamydiae are classified as bacteria which are the infectious agents previously suggested as playing a role in the pathogenesis of atherosclerosis (2). Before the histopathological detection of C.pneumoniae in atherosclerotic plaque, retrospective and cross-sectional studies had tended to show possitive associations between C.pneumoniae and prevalent coronary heart disease (3). Chlamydial organisms differ from most bacteria in that they grow only intracellularly. They survive and multiply in macrophages. Macrophages in the intima produce some cytokines and growth factors and elicit migration of smooth muscle cells from the media to the intima, as well as an inflammatory response that subsequently leads to the progression of atherosclerosis (4). That is why, chronic infection of C.pneumoniae in macrophages is believed to

enhance the proliferative and inflammatory processes of atherosclerosis by inducing some cytokines and lipoproteins (5).

Acute myocardial infarction (AMI) is an important health problem all around the world and the proportion of the death due to AMI is increasing seriously. Therefore, the investigations about AMI have been interesting gradually. Several results obtained from previous studies have shown that many different factors such as hypertension, smoking, family story (genetic factors), aging, feeding and sex, have acted very important roles in the pathogenesis of AMI (6). In spite of this, these risk factors have been observed in only the half of AMI patients. For this reason, there might be another factors that may be trigger of AMI.

In this study, the possible corelation between the presence of C.pneumoniae antibodies and AMI was investigated.

MATERIALS AND METHODS

In this study, 60 patients (14 women, 46 men; mean age, 59±11) and 30 healthy (10 women, 20 men, mean age, 52±10), totaly 90 persons were studied. The sera of the patients were collected in the week after the infarction. IgG antibiotic to C.pneumoniae was detected by the ELISA method. On the other hand, by giving a questionnaire to the subjects, it was investigated if there was a relation between life styles and habits of the subjects and C.pneumoniae infection. In the questionnaire, we asked the subjects for the knowledge of their family histories, feeding, smoking, alcohol drinking, life styles (sedentary or in stress), hypertension and diabetes mellitus.

RESULTS AND DISCUSSION

Serologic test results showed that 46 AMI patients (77%) were positive IgG while the positive results were obtained in 16 (53%) of the control subjects. The difference between two groups was statistically significant (x^2=5.87; $p<0.05$).

The results of the questionnaire were given in Table 1 and 2. According to the results, smoking (min. 10 cigarettes per day) and stress were the major risk factors for C.pneumoniae infection.

C.pneumoniae is a recently recognized respiratory pathogen and causes asemptomatic reinfections. The prevalence of antibodies to C.pneumoniae increases with age and is about 50% in middle-aged adults throughout the world. According to the results of Saiki et al (7) and Leinonen et al. (8), there was an association between C.pneumoniae infection and coronary heart disease as shown by the presence of elevated antibody levels or chlamydial lipopolisaccharide-containing immune complexes in the sera of 50% to 60% of patients with acute myocardial infarction or chronic coronary heart disease, compared with 7% to 12% among controls. In many recent studies have focused on the seroepidemiology, the level of IgG against C.pneumoniae in the patients with AMI and ischemic or chronic heart diseases was found higher than the control subjects. Therefore, the infection of C.pneumoniae might trigger the pathogenesis of cardiovascular diseases (3,7,9,10,11).

There are many possible risk factors on the basis of pathogenesis of cardiovascular diseases. However, C.pneumoniae infection might provoke the effect of these risk factors such as genetic structure, feeding,

	Possiti				Negati			
	Contro		Patien		Contro		Patien	
Possible risk factors	n	%	n	%	n	%	n	%
Familial history	31	52	4	13	29	48	26	87
Alcohol drinking	32	53	10	33	28	47	20	67
Smooking	42	70	13	43	18	30	17	57
Hypertension	23	38	10	33	37	62	20	67
Diabetes mellitus	4	7	2	7	56	93	28	93
Stress	46	77	18	60	14	23	12	30
Feeding not well	14	23	20	67	46	77	10	33

smooking, alcohol drinking and stress. Therefore, the diagnostic and therapic methods against to C.pneumoniae infection should be taken into consideration to prevent the pathogenesis of cardiovascular diseases.

		C.pneumoniae IgG Possitive		C.pneumoniae IgG Negative	
	Σn	n	%	n	%
Patients with AMI	60	46	77	14	23
Smoking	42	33	79	9	21
Familial history	31	27	87	4	13
Alcohol drinking	32	24	75	8	25
Stress	46	36	78	10	22
Feeding not well	46	38	83	8	17

REFERENCES

1. Grayston JT: Infections caused by Chlamydia pneumoniae strain TWAR. Clin Infect Dis 15:757 (1992).
2. Grayston JT, Kuo CC, Campbell LA, Benditt EP: Chlamydia pneumoniae, strain TWAR and atherosclerosis. Eur Heart 14:66 1993.
3. Saikku P: Chlamydia pneumoniae infection as a risk factor in acute myocardial infarction. Eur Heart J 14:62 (1993).
4. Ross R: The pathogenesis of atherosclerosis: an update, N Eng J Med 314:488 (1986).
5. Yamashita K, Ouchi K, Shirai M, Gondo T, Nakazawa T, Ito H: Distribution of Chlamydia pneumoniae infection in the atherosclerotic carotid artery. Stroke 29:773 (1998).
6. Sumpter, MT and Dunn, MI: Is coronary artery disease an infectious disease? Chest 112:302 (1997).
7. Saikku P, Leinonen M, Mattila K, Ekman MR, Nieminen MS, Makela PH, Huttunen JK, Valtonen V: Serological evidence of an association of a novel Chlamydia, TWAR, with chronic coronary heart disease acut myocardial infarction. The Lancet 2:983 (1988).
8. Leinonen M, Linnanmaki E, Mattila K, Nieminen MS, Valtonen V, Leirisalo-Repo M, Saikku P: Circulating immune complexes containing chlamydial lipopolysaccharide in acute myocardial infarction. Microb Pathog 9:67 (1990).
9. Yılmaz E, Ağaçfidan A, Yılmaz G, Koylan N, Badur S, Nişancı Y, Meriç M: Koroner kalp hastalarında Chlamydia pneumoniae infeksiyonu yeni bir risk faktörü olabilir mi?, I. Ulusal Chlamydia İnfek. Simp. Bildirileri, İstanbul, 83. (1995).
10. Serter D: Ateroskleroz ve koroner kalp hastalıklarında mikroorganizmaların rolü. Flora, 5:5 (2000).
11. Kawamoto R, Doi T, Tokunaga H, Konishi I: An association between an antibody against Chlamydia pneumoniae and common carotid atherosclerosis. Inter Med. 40:208 (2001)